



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,616	02/13/2002	Silvano Gai	112025-0482	7341
24267	7590	07/14/2005	EXAMINER	
CESARI AND MCKENNA, LLP 88 BLACK FALCON AVENUE BOSTON, MA 02210			FILIPCZYK, MARCIN R	
			ART UNIT	PAPER NUMBER
			2161	

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/074,616

Applicant(s)

GAI ET AL.

Examiner

Marc R. Filipczyk

Art Unit

2161

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 13-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 21 is/are rejected.
- 7) ☒ Claim(s) 8-12 and 22-25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 April 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

***Response to Arguments***

This Action is responsive to Applicants response filed on May 11, 2005 wherein claims 13-20 are cancelled and new claims 21-25 are submitted, thus claims 1-12 and 21-25 are pending.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2 and 7-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 2, the segment, “metacharacters are a wildcard metacharacter” is indefinite. The plurality of metacharacters is inconsistent. Second, “followed immediately by a repeat last character zero” is indefinite. It is not clear what the Applicants mean by repeat last character zero.

Regarding claim 7, the feature “mismatch pattern includes **all** don’t care values” is indefinite. It is not clear how the mismatch pattern includes all don’t care values.

Regarding claims 8-12 depend from claim 7 respectfully, therefore claims 8-12 are rejected on the same merits.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Fritchman (U.S. Patent No 6,785,677).**

Regarding claims 1 and 2, Fritchman discloses a method for programming a pattern matching engine having a plurality of information storage entries with one or more regular expressions (fig. 2, block 20), each regular expression including a plurality of characters and having a corresponding action to be applied to matching strings, the method comprising the steps of:

identifying one or more borders within a given regular expression, the one or more borders separating the given regular expression into a plurality of sub-expressions, at least one sub-expression having a plurality of sequential characters (figs. 3A-3C); and

loading one or more entries of the pattern matching engine with a plurality of the sequential characters from at least one sub-expression, (fig. 2, block 21, PATTERN; *preprocessing pattern string*); wherein

the borders are defined by a predetermined sequence of regular expression metacharacters, the metacharacters being wildcards (col. 7, Table; “\_” and “%”).

Regarding claim 3, Fritchman discloses organizing at least part of the pattern matching engine into a plurality of sections, and wherein each section of the pattern matching engine is

Art Unit: 2161

loaded with a plurality of search patterns for a corresponding sub-expression (fig. 2, block 21 and figs. 3A-3C);

Regarding claim 4, Fritchman discloses one of the search patterns includes a complete match of the respective sub-expression, a search pattern that includes a partial match of the respective sub-expression, and a mismatch pattern (fig. 2, block 22)

(Note: each pattern has a complete match, partial match and mismatch depending on the target string)

Regarding claim 5, Fritchman discloses associating at least one sub-expression with a current variable (figs. 4A-4C); and

loading the associated current state variable into each entry of the section of the pattern matching engine that contains the at least one sub-expression (fig. 2, blocks 22 and 23; TARGET *matched strings*, and figs. 4A-4C) .

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 6, 7 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fritchman (U.S. Patent No 6,785,677) in view of Sherman (U.S. Patent No. 6,389,507).**

Regarding claim 6, Fritchman discloses all of the claimed subject matter as discussed above including a pattern matching engine loaded with a regular expression (fig. 2, block 20) but does not expressly teach that the search engine has a content addressable memory (CAM). One of the benefits of a CAM is allowing program access to and from the memory (CAM).

Sherman teaches a search engine using a ternary CAM to store data for pattern matching (abstract and fig. 3).

Note, Fritchman uses a program to access the memory system's content (abstract, Fritchman). Hence, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to store Fritchman's data in a CAM since Fritchman's memory system supports and enables program interaction (abstract, Fritchman). One would have been motivated to combine the two pattern matching systems because both systems are compatible by supporting program access to memory and Fritchman system would benefit from the format advantages of using a ternary CAM.

Regarding claim 7, Fritchman/Sherman teach the CAM is a ternary CAM (fig. 3, Sherman) that supports don't care values (col. 7, table; *wildcards*, Fritchman), and

the mismatch pattern includes don't care values (fig. 2, block 22, TARGET; values RS, Fritchman).

Regarding claim 21, Fritchman discloses all of the claimed subject matter as discussed above including the pattern matching engine loaded with a regular expression (fig. 2, block 20), in addition Fritchman discloses the regular expression is associated with an action (fig. 2, prefix, suffix, Fritchman), but does not expressly teach that the pattern matching engine further includes a second memory with entries, and that the second memory's entries are loaded with actions.

Sherman teaches a search engine using a ternary CAM to store data for pattern matching (abstract and fig. 3). Sherman further teaches the pattern matching engine (fig. 3 and col. 6, lines 27-46) including at least a first and second memory (fig. 3, *TCAM* and *SRAM* and *DCAM*) with entries, and that the second memory's entries are loaded with actions (fig. 3, *associated data*). Hence, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to store Fritchman's data in a CAM since Fritchman's memory system supports and enables program interaction (abstract, Fritchman). One would have been motivated to combine the two pattern matching systems because both systems are compatible by supporting program access to memory and Fritchman system would benefit from the format advantages of using a ternary CAM.

### ***Response to Arguments***

Applicant's arguments filed May 11, 2005 have been fully considered but they are not persuasive. The arguments and responses are listed below.

Applicant argues on pages 11 and 12 of the 5/11/05 response that Fritchman does not teach loading of characters from sub-expressions into the entries of a pattern matching engine.

Art Unit: 2161

Examiner disagrees. Fritchman discloses loading characters from sub-expressions into the entries of a pattern matching engine to perform a sequential match illustrated in fig. 2, items 20, 21 and 22. Examiner points the Applicant's attention for a relevant definition of "load" to Microsoft Computer Dictionary, Fifth Edition: **load – to place information from storage into memory for processing, if it is data, or for execution, if it is program code.**

Clearly it is not necessary for Fritchman to use the term "load" since he clearly uses information from memory for processing. For more information refer to the rejection above and col. 2, lines 37-49 and related text.

With respect to all the pending claims 1-12 and 21-25, Examiner respectfully traverses Applicant's assertion based on the discussion and rejection cited above.

#### ***Allowable Subject Matter***

Claims 8-12 and 22-25 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims.

Regarding claims 8 and 22, the prior art of record or that encountered in searching for the invention, fails to disclose or suggest each regular expression is associated with an action, the pattern matching engine including a second memory device having a plurality of entries and that the entries of the second memory device are loaded with the actions associated with the one or more regular expression, in addition, the pattern matching having a ternary content addressable memory (TCAM) for one or more expressions that support don't care values as claimed.

Regarding claims 9-12 and 23-25 are also allowable because they depend from allowable claims 8 and 22, respectively.



*Conclusion*

To expedite the process of examination Examiner requests that all future correspondences in regard to overcoming prior art rejections or other issues (e.g. amendments, 35 U.S.C. 112, objections and the like) set forth by the Examiner that Applicants provide and link to the most specific page and line numbers of the disclosure where the best support is found (see 35 U.S.C. 132).

Applicant's amendment of submitting new claims 21-25 necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marc R. Filipczyk whose telephone number is (571) 272-4019. The examiner can normally be reached on Mon-Fri, 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Safet Metjahic can be reached on (571) 272-4023. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2161

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MF  
June 30, 2005

*Frantz Coby*  
**FRANTZ COBY**  
**PRIMARY EXAMINER**